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William Reynolds Vines was born in Bristol in 1817. He began life as a Moravian missionary, and served in Jamaica for some years, until he was invalided home. He eventually established a large and successful school at Elm Grove, Ealing, but was obliged to give it up in 1863 on account of ill-health. He had married in 1847, and had one son (now Sherardian Professor of Botany at Oxford). From 1863 onwards he travelled a great deal, but ultimately settled in 1889 at Auckland, New Zealand, where he died on 1897 November 16. He was elected a Fellow of the Society on 1855 April 13.

Charles Clement Walker was born in Clerkenwell in 1822, and was educated in London. He served his apprenticeship as a marine engineer, and later joined his brother, the late Mr. William Walker, in the construction of gas-work machinery, first in Clerkenwell and afterwards at Donnington. The business prospered greatly under the management of the brothers, and the works at Donnington now find employment for some 700 men. The firm have carried out some of the largest structures for the purification and storage of gas in this country and abroad. Mr. Walker was liberal in devoting his wealth to public and charitable objects—as, for instance, in the laying out of Wilmington Square and Northampton Square, in Clerkenwell.

Mr. Walker was one of the oldest readers at the British Museum, having obtained a reading-ticket at the age of 18, and scarcely ever missed an opportunity of visiting the Museum when he came to London. He had a telescope at his residence, Lilleshall Old Hall, and astronomy was his favourite study.

He died on 1897 February 4, from pneumonia and prostration following a severe attack of influenza.

He was elected a Fellow of the Society on 1879 March 14.

Wilhelm Döllen was born at Mitau, 1820 April 25. He there received his earliest instruction, chiefly from his father, who was principal of an excellent school; and at a very early age the exceptional ability of the boy, especially for mathematics, was made manifest. When he was 14 years old, his whole family removed to Dorpat, where he was introduced to the celebrated mathematician Bartels, who soon satisfied himself of Döllen's powers, and advised him, notwithstanding his youth, to attend the mathematical lectures at the University in the following year. From 1836 onwards Döllen also attended the astronomical lectures of W. Struve, with whom and whose family he, from this time, remained on the most intimate terms. According to the statutes Döllen could only be received as a student in the University in the summer of 1837, on attaining the age of 17, but he completed his course in the spring of 1839, and gained his degree with honours in mathematics. Immediately after this he was appointed assistant in the Dorpat Observatory, and remained for five years in that capacity, during which time he

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undertook to carry to completion the determinations of positions of double stars by means of the meridian circle, which work had hitherto been carried on by W. Struve and Preuss. The result of this labour was published at a later date in one of the volumes of the Dorpat Observations, and forms an important part of W. Struve's well-known *Stellarum compositarum Positiones mediæ.* To this lengthened stay in Dorpat Döllen was especially indebted for that thorough acquaintance with all departments of human knowledge which distinguished him in later life.

In the spring of 1844 Döllen was appointed supernumerary assistant at the Observatory of Pulkowa. In this capacity he took a most zealous share in the great chronometer expedition between Altona and Greenwich, by which the longitudes of Continental observatories from Greenwich were ascertained for the first time with a fair amount of precision. Döllen gratefully remembered for the rest of his life the kindly courtesy and helpful advice of Airy during his long stay at the Royal Observatory, Greenwich. Three years later, in 1847, a vacancy occurred for an assistant at the Pulkowa Observatory, and Döllen was formally appointed. In this position (excepting only that he was subsequently promoted to the rank of Älter-Astronom) Döllen remained without interruption until the year 1890. Several times during this long period of time he acted as Director, during the latter's absence from illness or other causes.

The first of Döllen's own individual work, which had for its title "Neue Reduction der Königsberger Declinationen für 1820," appeared in 1849 in the *Memoirs* of the St. Petersburg Academy of Sciences. Some years previously he had been attracted by the then little regarded suggestions of Gauss for map-projections, and had constructed, not only convenient formulæ, but tables for their practical application. In consequence of this work, the Gaussian method of projections was in 1847, at the suggestion of W. Struve, introduced into all the cartographical work of the Russian General Staff. Some special researches of Döllen were published by him in 1853 in a separate work, under the title of *Meletemata de Methodis secundum quas superficies delineantur.* In the same year (1853) there appeared Döllen's well-known discussion, in the *Bulletin* of the St. Petersburg Academy, under the title, "Ueber Dr. Wichmann's Bestimmung der Parallaxe des Argelander'schen Sterns (Gr. 1830)," which excited general attention, not only by its sharp criticism of the above-mentioned determination, but also by its comprehensive and searching discussion of the sources of error in observations made with the heliometer. This discussion, moreover, was of the highest value in urging on those improvements in the construction and use of the heliometer by which this instrument has attained its present position as the finest astronomical instrument of precision.

In 1855 Döllen was appointed Professor of Geodesy and

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Surveying, his students being the military and marine officers who spent the regulation two years in these studies at Pulkowa. This position not only afforded him an opportunity of exercising his exceptional powers as a teacher (so that we have him to thank for the series of splendidly trained geodesists who, during the decades 1860–90, conducted the geodetic and geographical work of Russia, and brought it to so high a degree of perfection), but also drew his special attention to researches on the methods of observation employed and the construction of the instruments to be used in the work. Amongst his numerous contributions to this subject, the two most important papers appeared in 1863 and 1874, under the title of *Die Zeitbestimmung vermittelst des tragbaren Durchgangsinstruments im Verticale des Polarsterns*, which have made this excellent method for the determination of time widely known and adopted in practice. His work in this direction has been completed by the Ephemerides which he regularly computed and published from 1886 till the time of his death.

It was only in the first few years that Döllen took an active part in the special astronomical observations at the Observatory of Pulkowa. So early as the autumn of 1850 he had a severe attack of typhus fever on which pneumonia supervened. His strong constitution carried him through the sickness, but during the rest of his life he was subject to chronic lung trouble, which necessitated his taking the greatest care to avoid catching cold, to which the observing astronomer is so liable. Before this he had made observations with the Repsold Meridian Circle for the completion of the Pulkowa Catalogue (Epoch 1845) of all stars down to the 6th magnitude. Later he carried on the fundamental determinations of declination with the great Vertical Circle; but he soon found it necessary to discontinue the work, his weak health compelling him to give up night work. He accordingly occupied himself the more zealously in day observations with portable instruments, in order to examine and develop the various methods of observation for the purpose of determining geographical position. These studies naturally gave him various ideas for improving the construction of the instruments used in this kind of work, which have been duly regarded by the best instrument makers, particularly the Repsolds.

By the advice of his physician, Döllen on two occasions passed the winter in Africa—in Algeria during 1866, and in 1874 in Egypt. These two journeys at the same time afforded him an opportunity of observing the transit of *Venus* at Thebes, in company with Professor Auwers, and of working jointly with Dr. Gill at the geography of those regions.

Soon after Otto Struve left Pulkowa, in the beginning of 1890, Döllen retired completely into private life, and chose for his abode Dorpat, the spot he had loved from early youth. Even here, although freed from all official obligations, he could not be idle. He was especially desirous of assisting in the further

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development of nautical astronomy, which science has scarcely made any progress, beyond improvements in the chronometer and compass observations, during the course of the present century, whilst the extraordinary increase in navigation evidently demands more exact determinations of a ship's place at sea than the methods previously in use. With this object in view, in 1893 Döllen published an appeal for assistance in his endeavour, and only a few weeks before his death he published a pamphlet under the title "Zur Reform der Nautischen Astronomie, Tabulæ Dorpatenses," with convenient formulæ based on Sumner's method, and gave the requisite tables calculated for a determinate latitude (58°–59°).

In the foregoing notice only the most important of Döllen's publications have been mentioned. He displayed his greatest activity indirectly as a teacher and a critic of the work of others. During his forty-five years of official life at Pulkowa almost all the work of the Observatory was influenced by his spirit and his extensive knowledge. He was the general arbiter in scientific questions. In such ways as these he essentially contributed to the prosperity of the Pulkowa Observatory under the directorship of the two Struves.

Döllen in 1848 married Charlotte, the eldest daughter of W. Struve, and spent with her forty-six years of happy married life until the time of her death in 1894.

After his retirement from official work, in 1890, it became clear that there was not only lung-trouble but weakness and ossification of the heart, which eventually brought on his death, 1897 February 16.

He was elected an Associate of the Society on 1882 November 10.

Friedrich August Theodor Winnecke was born on 1835 February 5, at the village of Gross-Heere, near Hildesheim, in Hanover, where his father was pastor. A few days after his birth his mother died, and the charge of the child devolved upon his two aunts. His father, who suffered so keenly the sudden death of his wife, resigned his parsonage after a few years. At the age of five young Winnecke was established in the home of his relations at Gittelde, in the Hartz, and later on at Hoya, where he was educated at the Gymnasium till 1850, when he went to the Lyceum at Hanover. Leaving that school when he was eighteen, he entered the University of Göttingen, and devoted himself to astronomical and mathematical studies. He had already shown great inclination in that direction while at school at Hanover by diligently observing the heavens with such small instruments as were available. At Göttingen, in company with Pape, he made observations of comets with a comet-seeker of 34 lines aperture, and determined their places with a ring micrometer. It is interesting to note that at Göttingen Winnecke aroused the enthusiasm for astronomy of the present Professor